THE CHEMICAL SOCIETY.

ANNIVERSARY MEETING,

MARCH 30TH, 1883.

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ANNIVERSARY MEETING

March 30th, 1883.

Dr. J. H. Gilbert, F.R.S., President, in the Chair.

The following Report was read by the President:—

According to the Bye-Laws, it is the duty of the President to pres
a report of the state of the Society at the Annual General Meetin
the Fellows. A glance at the Addresses of my predecessors sh
that the obligation has been very variously interpreted, according
the special circumstances of the Society at the time, or to the spe
view of the President himself. There have been occasions when
portant questions affecting the interests of the Society had to be
cussed—sometimes involving matters of internal working
management, at others the consideration of some new departure,
a view to more extended usefulness.

At present there are no such points requiring special notice.
my duty rather to record steady progress in the attainment of
objects for which the Society was founded; and for myself, ha
been elected into the Society during its first Session, now with
few weeks of 42 years ago, it seems fitting that I should attemp
review the progress of the Society, in some important aspects,
the commencement of its existence up to the present time. I
that such a review will not be without interest to the Fellows,
that it may even prove to be of some practical utility.

The Number of Fellows.—Obviously a very essential, though b
means the only necessary element, of the prosperity of a Society
objects of which are defined to be—"The promotion of Chemistry
of those branches of Science immediately connected with it,"—i
number of Fellows it has attracted. I will, therefore, first call
attention to the progress of the Society in this respect.

Of the 25 gentlemen who met on February 23rd, 1841, for the pu
of taking into consideration the formation of a Chemical Society
names of only two are still to be found in the list of our Fel
Dr. Lyon Playfair, and Mr. Charles Heisch; and of the first Of
and Council, the name of not one is still there to be found. In
of the 118 Members on the Register at the first Anniversary Me
of the Society, held on March 30th, 1842, there remain onl

esides myself, who could now answer to the roll-call, namely, Professor Thomas Andrews, Mr. William Blythe, Dr. De la Rue, Mr. Charles Heisch, Mr. F. R. Hughes, Dr. G. D. Longstaff, Mr. Thomas Pearsall, Mr. J. Arthur Phillips, Dr. Lyon Playfair, Dr. E. Schunck, Mr. J. Denham Smith, and Dr. James Young.*

The following tabular statement shows the number of Ordinary Members or Fellows, of Associates, and of Honorary and Foreign Members, at the end of each period of five years, during the 40 years from 1841–2 to 1880–1 inclusive. It also shows, for comparison, the numbers for 1881–2, and for the year now closing, 1882–3:—

Five-year periods ending March 30.	Ordinary Members or Fellows.			Associates.	Honorary or Foreign Members.
	Total.	Increase.			
		Total.	Average per annum.		
1846.....	185	—	—	9	6
1851.....	229	44	8·8	2	20
1856.....	256	27	5·4	9	20
1861.....	342	86	17·2	10	30
1866.....	482	140	28·0	6	37
1871.....	582	100	20·0	3	34
1876.....	881	299	59·8	0	30
1881.....	1096	215	43·0	0	31
1881–2.....	1175	79	79·0	0	29
1882–3.....	1247	72	72·0	—	37

The following is a more detailed statement, in the usual form, of the Members for the past year 1882–3:—

Number of Fellows at the Anniversary, March 30th, 1882		1175
Since elected and paid admission fees		104
		1279
Removal on account of arrears.....	16	
Withdrawn	7	
Deceased	9	
	—	32
		1247

* W. R. Grove, Esq. (now Mr. Justice Grove), was present at the meeting for the formation of the Society, and was on the first Council, but is not now on the list of the Society.

Number of Foreign Members at the last Anniversary....	29
Since elected	9
	38
Deceased.....	1
Present number.....	37

Thus, we have lost by death 9 Fellows, and 1 Foreign Member. We have also lost 16 by removal on account of arrears, and 7 by withdrawal.

Notices of the Fellows lost by death will be given further on.

It will be seen that notwithstanding these losses, the total number of Fellows has increased by 72 since the last Anniversary Meeting, and our numbers stand higher than ever before. It has already been mentioned that, at the first Anniversary Meeting of the Society, there were 118 Ordinary Members on the Register, whilst now at the conclusion of its forty-second year there are 1247 Fellows on the list. In other words, our numbers have increased more than ten-fold from the first year to the last; and as the foregoing table shows, there has been, upon the whole, though with some fluctuations, an augmentary rate of increase. The record of the number of Associates is somewhat uncertain; but, notwithstanding the greatly increased number of Students of Chemistry, it has certainly declined in recent years, probably owing to preference for full Fellowship, as soon as the means of the student permit. At first the number of Honorary or Foreign Members was limited to 25; but with the great increase in the number of workers of eminence abroad, it was decided in 1860 to raise the limit to 40. This number was at one time filled up; but at the date of the last Anniversary Meeting it had become reduced by death to 29, and more recently to 28; and it will be in the recollection of the Fellows that only a few weeks ago the names of nine distinguished Foreign Chemists were added to the list, thus again bringing up the number to 37.

The important questions obviously suggest themselves—how far the work accomplished by the Society, and the advancement of Chemical knowledge in the country at large, are commensurate with the increase in its numbers. According to its Founders, the means to be adopted by the Society are—"the reading, discussion, and subsequent publication of Original Communications. Also the formation of a Chemical Library and Museum." What has been accomplished in regard to these several objects?

The number of papers presented to the Society:—This affords some measure of the activity of its Members, and of the work accomplished under its auspices, in the way of original investigation; and I think the

following summary will therefore not be without interest. It shows the total number of Papers read at the meetings of the Society, within each of the eight five-year periods of the first 40 years, and the average number per annum during each of those periods. It also shows the number of Discourses and Faraday Lectures that have been delivered; and at the foot of the table are given similar particulars for 1881–2, and for the year now closing, 1882–3:—

Five-year periods ending March 30.	Papers read.		Discourses delivered.	
	Total number.	Average per annum.	By Fellows.	Faraday Lectures.
1846.....	167	33·4	0	—
1851.....	209	41·8	0	—
1856.....	122	24·4	9	—
1861.....	140	28	17	—
1866.....	165	33	19	—
1871.....	201	40·2	17	1 (1869)
1876.....	264	52·8	14	2 (1872 & 1875)
1881.....	392	78·4	7	1 (1878)
1881–2.....	87	87	1	1 (1881)
1882–3.....	70	70	1	—

It is thus seen that after the first decade the number of papers presented to the Society decreased considerably; and in the Sessions 1854–55 and 1855–56, it only reached 17 and 18 respectively. In the Session of 1853–54 the first Discourse was delivered, by the late Professor Graham, it having been decided by the Council that—"In order to increase the interest of the meetings of the Society, certain meetings, not exceeding five in the year, shall, after the transaction of the ordinary business, be devoted to the delivery of Discourses on matters connected with the Progress of Chemistry, and which may be illustrated by experiment." Under this rule there have been 86 Discourses delivered during the period of nearly 30 years, from 1853 up to the present time. I may mention that on looking up these facts, I find that my own contribution to the series has been five; three of which were subsequently written and printed in the Journal as joint papers by Mr. Lawes and myself.*

In the third session after the adoption of the plan, as many as seven discourses were delivered; and in subsequent years as many as

* "On some Points in the Composition of Wheat Grain, its Products in the Mill, and Bread" (**10**, 1); "On the Sources of the Nitrogen of Vegetation, with special reference to the question whether Plants assimilate Free or Uncombined Nitrogen" (**16**, 100); "On the Composition, Value, and Utilisation of Town Sewage" (**19**, 80).

six, five, or four, have been given. In the five years ending 1861, 17; in the next five years, 19; in the next, 17, and in the next, 14 were given; but in the four years ending 1880, only 7; in 1880–81, not one; in 1881–82, only one; and in 1882–83, only one.

A glance at the list of the authors, and of the subjects of these Discourses, recalls to mind the great interest and value of many of them. But, however desirable it may be, in these days when Chemistry includes so many distinct branches of study, and most of the workers in it must of necessity be more or less specialists, to have the results obtained in other departments summarised and illustrated by those who have devoted special attention to them, it must nevertheless be accepted as a matter for congratulation that in recent years it has become less and less necessary to occupy the time of our ordinary meetings by such discourses. The legitimate object of our meetings is the reading and discussion of original communications, and supposing that a sufficient number of these is contributed, there is still, it seems to me, no reason why extra meetings should not be set apart for discourses, when subjects of general interest might with advantage be brought before the Fellows in that way. The fact is, that in the fourth decade of the Society's existence, the number of original communications presented to it greatly increased, and this marked increase in the number of papers read is coincident with the period of rapid increase in the numbers joining the Society. During the last four years the number of papers read have been 75, 113, 87, and 70 respectively; in each case, excepting the last, a larger number than in any previous year; and during these four years only three ordinary discourses have been delivered; not one having been given in the Session 1880–81, when the very large number of 113 papers was presented.

But during recent years, we have had five Faraday Lectures delivered, by Foreigners of marked distinction in their different spheres of labour. The inaugural address of the series was given by Dumas, on June 17th, 1869; and, although it was also much more, it was an eloquent tribute to the importance and influence of the labours of the great Philosopher in whose memory, and in whose honour, the Faraday Lectures were instituted. The second lecture was delivered by Cannizzaro, on May 30th, 1872, and was entitled "Considerations on some points of the Theoretic Teaching of Chemistry." The third was by Hofmann, on March 18th, 1875, "On the Life-work of Liebig in Experimental and Philosophic Chemistry." The fourth was by Wurtz, on November 13th, 1878, "On the Constitution of Matter in the Gaseous State." The fifth and last was given by Helmholtz on April 5th, 1881, "On the Modern Development of Faraday's Conception of Electricity."

The following is a list of the Papers read before the Society between March 30th, 1882, and March 30th, 1883:—

I. "On the Action of Acetyl Chloride on Fumaric Acid:" by W. H. Perkin.

II. "Some Arguments in Favour of the Prism-formula of Benzene:" by U. K. Dutt.

III. "Note on a Convenient Apparatus for the Liquefaction of Ammonia:" by J. Emerson Reynolds.

IV. "On the Transformation of Urea into Cyanamide:" by H. J. H. Fenton.

V. "On the Action of Haloïd Acids upon Hydrocyanic Acid:" by L. Claisen and F. E. Matthews.

VI. "On the Atomic Volume of Iodine:" by W. Ramsay.

VII. "On Molecular Volumes:" by W. Ramsay.

VIII. "On the Action of Acetone on Phenanthraquinone, both Alone and in the Presence of Ammonia:" by F. R. Japp and F. W. Streatfeild.

IX. "A Study of some of the Earth-metals contained in Samarskite:" by H. E. Roscoe and A. Schuster.

X. "On the Action of Thiophosphoryl Chloride upon Silver Nitrate:" by T. E. Thorpe and S. Dyson.

XI. "Note on the Action of Oxychloride of Sulphur on Silver Nitrate:" by T. E. Thorpe.

XII. "On the Behaviour of Zinc, Magnesium, and Iron as Reducing Agents with Acidulated Solutions of Ferric Salts:" by T. E. Thorpe.

XIII. "Experiments on the Action of Potassium-amalgam, Sulphuretted Hydrogen, and Potassium Hydrate respectively on Tetra- and Penta-thionates of Potassium:" by V. Lewes.

XIV. "On the Precipitation of Alums by Sodic Carbonate:" by E. J. Mills and R. L. Barr.

XV. "On Rotary Polarisation by Chemical Substances under Magnetic Influence:" by W. H. Perkin.

XVI. "On the Constitution of Amarine and Lophine:" by F. R. Japp and H. H. Robinson.

XVII. "On the Determination of Nitric Acid in Soils:" by R. Warington.

XVIII. "On a Spectroscopic Study of Chlorophyll:" by W. J. Russell and W. Lapraik.

XIX. "Notes on β-Naphthaquinone:" by C. E. Groves.

XX. "On some New Compounds of Brazilein and Hæmatein:" by J. J. Hummel and A. G. Perkin.

XXI. "On the Determination of Nitric Acid as Nitric Oxide by

means of its Reaction with Ferrous Salts." Part II: by R. Warington.

XXII. "On a New Process of Bleaching:" by J. J. Dobbie and J. Hutcheson.

XXIII. "Metallic Compounds containing Bivalent Hydrocarbon Radicals." Part III: by J. Sakurai.

XXIV. "On the Crystallisation from Supersaturated Solutions of certain Compound Salts:" by John M. Thomson and W. Popplewell Bloxam.

XXV. "On Oxypropyltoluidine:" by H. Foster Morley.

XXVI. "On some Halogen-compounds of Acetylene:" by R. T. Plimpton.

XXVII. "On Dihydroxybenzoic Acids and Iodosalicylic Acids:" by A. K. Miller.

XXVIII. "On Crystalline Molecular Compounds of Naphthalene and Benzene with Antimony Trichloride:" by Watson Smith and G. W. Davis.

XXIX. "Additional Evidence by an Analysis of the Quinoline Molecule that this Base belongs to the Aromatic Series of Organic Substances:" by Watson Smith and G. W. Davis.

XXX. "On Orcinol and some of the other Dihydroxytoluenes:" by H. C. Nevile and D. A. Winther.

XXXI. "On the Varying Quantities of Malt Albuminoïds extracted by Waters of Different Types:" by E. R. Moritz and A. Hartley.

XXXII. "On the Derivatives of Ethylene Chlorobromide:" by J. W. James.

XXXIII. "Contributions to the Chemistry of Tartaric and Citric Acids:" by the late Beaumont J. Grosjean.

XXXIV. "Contributions to the Chemistry of Bast Fibres:" by C. F. Cross and E. J. Bevan.

XXXV. "On the Oxidation of Cellulose:" by C. F. Cross and E. J. Bevan.

XXXVI. "On the Analysis of certain Vegetable Fibres:" by C. Webster.

XXXVII. "On the Constitution of some Bromine-derivatives of Naphthalene." Third Notice: by R. Meldola.

XXXVIII. "On the Constitution of Lophine:" by F. R. Japp.

XXXIX. "On the Condensation-products of Œnanthaldehyde." Part I: by W. H. Perkin, jun.

XL. "On the Condensation-products of Isobutyl Aldehyde:" by W. H. Perkin, jun.

XLI. "On the Condensation-products of Phenanthraquinone with Ethylic Acetoacetate:" by F. R. Japp and F. W. Streatfeild.

XLII. "On the Constitution of Lophine:" by H. E. Armstrong.

XLIII. "On the Constitution of Molecular Compounds. The Molecular Weight of Basic Ferric Sulphate:" by S. U. Pickering.

XLIV. "On the Chemistry of Hay and Ensilage:" by F. W. Toms.

XLV. "On certain Brominated Compounds obtained in the Manufacture of Bromine:" by S. Dyson.

XLVI. "Note on the Preparation of Diphenylene Ketone Oxide:" by W. H. Perkin.

XLVII. "On the Condensation-products of Œnanthaldehyde." Part II: by W. H. Perkin, jun.

XLVIII. "On the Behaviour of the Nitrogen of Coal during Destructive Distillation; with some Observations on the Estimation of Nitrogen in Coal and Coke:" by W. Foster.

XLIX. "On the Absorption of Weak Reagents by Cotton, Silk, and Wool:" by E. J. Mills and J. Takamine.

L. "The Alkaloïds of Nux Vomica. (No. 2.) On Brucine:" by W. A. Shenstone.

LI. "Preliminary Note on some Diazo-derivatives of Nitrobenzyl Cyanide:" by W. H. Perkin.

LII. "Researches on the Induline Group:" by O. N. Witt and E. G. P. Thomas.

LIII. "On the Fluorine-compounds of Uranium:" by A. Smithells.

LIV. "On a New Method of Estimating the Halogens in Volatile Organic Compounds:" by R. T. Plimpton and E. E. Graves.

LV. "On a Modified Liebig's Condenser:" by W. A. Shenstone.

LVI. "On two New Aluminous Mineral Species, Evigtokite and Liskeardite:" by W. Flight.

LVII. "On the Volume-alteration attending the Mixture of Salt Solutions:" by W. W. J. Nicol.

LVIII. "On some Derivatives of Fluorene:" by W. R. E. Hodgkinson and F. E. Matthews.

LIX. "On the Action of Chlorine on certain Metals:" by R. Cowper.

LX. "Some Notes on Hydrated Ferric Oxide and its Behaviour with Hydrogen Sulphide:" by L. T. Wright.

LXI. "On Alphacyanonaphthalene-sulphonic Acid:" by U. K. Dutt.

LXII. "On some Derivatives of Diphenylene Ketone Oxide:" by A. G. Perkin.

LXIII. "On α-Ethylvalerolactone, α-Ethyl β-Methylvalerolactone, and on a Remarkable Decomposition of β-Ethylacetosuccinic Ether:" by S. Young.

LXIV. "On some Derivatives of the Isomeric $C_{10}H_{14}O$ Phenols:" by H. E. Armstrong and E. H. Rennie.

LXV. "On some Chemico-microscopical Researches on the Cell-contents of certain Plants:" by A. B. Griffiths.

LXVI. "On the Phenates of Amido-bases:" by R. S. Dale and C. Schorlemmer.

LXVII. "On some Condensation-products of Aldehydes with Acetoacetic Ether and with Substituted Acetoacetic Ethers:" by F. C. Matthews.

LXVIII. "Contributions to the Chemistry of Fairy Rings:" by Sir J. B. Lawes, J. H. Gilbert, and R. Warington.

LXIX. "On Lines of No Chemical Change:" by E. J. Mills and W. McD. Mackey.

LXX. "On Homologous Spectra:" by W. N. Hartley.

There have thus been only 70 papers read before the Society in the past year, against 87, 113, and 75, respectively, in the three preceding years; but prior to these years, only once, namely, in 1876–7, was there as high a number as in the year just passed. Of the 70 papers that have been read, rather more than one-half have been in the domain of Organic Chemistry, the remainder having reference to a wide range of subjects. Although, of necessity, investigations in Organic Chemistry, as indeed in other branches, involve much special detail, yet it cannot fail to be recognised that there is more and more of tendency to classification, and so to relieve the record of results of the character of the mere enumeration of isolated facts. The number of instances of the production in the laboratory of bodies formerly known only as products of vegetable or animal life, is also constantly increasing. Coincidently with these advances we find, not only in the original papers, but also in the systematic works, of both Vegetable and Animal Physiologists, much more of definiteness and certainty in the chemical explanation of the processes of the living organism. This is surely a very essential direction of advance in Organic Chemistry.

There has also been one Discourse delivered, by Professor Dewar—"On the Recent Development of the Theory of Dissociation." Dissociation was defined to be decomposition under such conditions—that the products of the reaction remain within the sphere of chemical action, and that the process is reversible, in the thermo-dynamic sense of the term. Attention was particularly called to the great accumulation of experimental evidence on the subject since the date of the

Lecturer's previous discourse (1874). Further, the mathematician had rendered great service to the chemist by systematising and classifying the phenomena. The phenomena of dissociation were illustrated by numerous experiments.

The Journal.—Reference will be made further on to the greatly increased space devoted in the Journal, in recent years, both to the Transactions, recording the work of our own Society, and to the Abstracts, indicating the activity of chemical research in other countries as well as our own. As showing the greatly increased circulation of our Journal, it may be of interest to state that, in 1863, when the new Series was commenced, the number printed was raised from 600 to 750; in 1868 to 850; in 1871 to 1500; in 1881 to 1750; whilst at the present time 1775 copies are printed. Of these, between 1200 and 1300 are distributed to Fellows of the Society: and of the Journal of the present year (1883), 242 copies had been sold up to March 15; the distribution being approximately as follows:—At home, 70; to America, 70; to Germany, 40; to other parts of the continent of Europe, and to India, 60. Here I may mention in passing that, in a recent tour in America, I found our Journal was taken, and much appreciated, in most of the Institutions I visited.

The Library and Museum.—According to our Charter, the formation of a "Library of Scientific Works, and also a Museum of Chemical Preparations and Standard Instruments" are among the objects of the Society.

I am informed that a commencement was made many years ago in the formation of a Museum of Chemical Preparations; and it is recorded in the Journal that a number of specimens were contributed from the Great Exhibition of 1851. It seems, however, that the collection was not deemed to be of sufficient importance and value for maintenance and extension, and that it was eventually distributed; the specimens received from private individuals being returned to the donors, and others being sold. I have not found any record of the matter in the Journal; and I am not prepared to advise that another attempt should be made to form a chemical museum. But I may mention that it has been suggested to me as desirable that the Society should possess such a collection, and that, as a nucleus, the authors of papers on new compounds should be requested to present specimens to the Society.

Of the Library, a much more favourable account can be given. The last Catalogue of the Library was printed in 1873; and the Council have decided, on the recommendation of the Library Committee, that a new Catalogue, arranged in order of subjects, shall be prepared, printed, and issued to the Fellows, as soon as possible. The total number of volumes catalogued in 1873 was 3540, and there have

since been added to the Library 3260 volumes, making in all, at the present time, 6800 volumes. During the same period of about ten years, the number of pamphlets has been increased from 540 to 760.

The following is a more detailed statement of the previous and present contents of the Library, as kindly furnished to me by the Librarian :—

I. *Number of Systematic Works.*

Subjects.	1873.	Since added.	1883.
Physics	147	108	255
General Chemistry	170	86	256
Inorganic	23	26	49
Organic	27	31	58
Physiological	27	60	87
Vegetable Physiology and Agriculture	33	77	110
Analytical	37	128	165
Technical	122	234	356
Mineralogy and Geology	46	57	103
Meteorology	7	9	16
Biography	5	3	8
Miscellaneous	11	22	33
Dictionaries	8	15	23
	663	856	1519

II. *Number of Volumes.*

Volumes of systematic works in 1883	2600
,, Journals in 1883	3600
,, Duplicate Journals for circulation	600
Total number of volumes	6800
Catalogued in 1873	3540
Added 1873 to 1883	3260

The number of Pamphlets in the Library is as follows :—

In 1873	540
Since added	220
Total	760

Thus the Library has been nearly doubled in the last ten years, and our shelves are very nearly full. There can be no question that the provision of a good Library of Scientific Works and Journals is one

of the most important objects to which the funds of the Society can be devoted; and it is desirable that the Fellows should make themselves acquainted with the Rules for the use of the Library at Burlington House, and also for the circulation of Works and Journals, which are now of a very liberal and practical character, offering great facilities for study and for reference.

The Research Fund.—The Treasurer will present a detailed statement of the accounts of this Fund for the past year. It may be well, however, to give, in this place, a brief notice of the history and general condition of the Fund. In 1872, Mr. T. Hyde Hills offered a donation of £10, and to continue a like donation for several years, under certain conditions as to co-operation, with a view to the institution of a small special fund to be expended in money grants to investigators; but this proposal did not at the time meet with sufficient response. In 1876, one of the original members of the Society, Dr. G. D. Longstaff, offered the sum of £1000 towards the establishment of a permanent fund for the furtherance of research, provided a like sum were subscribed, and the £2000 invested for the purpose. It is not a condition that the fund should necessarily be expended exclusively in the form of money grants to investigators, but that it should be applied in any ways the Council may from time to time consider the most conducive to the advancement of Chemical Science. The conditions as to further subscriptions were very soon fulfilled, as the following tabular statement will show :—

Years.	Donations and subscriptions.	Investments.	Dividends.	Grants.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
1876*.....	1000 0 0	1000 0 0	—	—
1876–7.....	2333 13 0	2050 0 0	—	—
1877–8.....	986 19 0	919 12 6	121 11 11	245 0 0
1878–9.....	227 6 0	—	138 19 11	250 0 0
1879–80.....	273 11 0	102 17 6	141 2 6	495 0 0
1880–1.....	257 7 0	313 2 6	141 12 0	111 0 0
1881–2.....	142 5 0	—	171 12 5	100 0 0
1882–3.....	120 1 0	212 0 0	137 3 5	220 0 0
Totals	5341 2 0	4597 12 6	852 2 2	1421 0 0

It will be understood that it is no part of my purpose to present a balance sheet of the Research Fund, which the foregoing statement obviously does not do. I may mention, however, that up to the present time the expenses of the administration of the Fund have

* Dr. Longstaff's original donation.

amounted to less than £10. It will be seen that the amount disbursed as grants considerably exceeds the dividends on the sums invested, nearly, £600 having been appropriated from the subscriptions. Still, the amount invested remains at about £4600. Although it is obviously desirable that a sufficiently large sum should remain invested to yield an income available for future demands, it would appear that the Fund could without detriment meet larger claims than it has recently been called upon to do, provided it seemed that researches of sufficient importance and promise could appropriately be so aided.

The Finances of the Society.—Here, again, it is no part of my intention to present anything in the way of a balance-sheet, my only object being to give a general view of the progress and position of the Society in the matter of finance in some aspects of interest.

Below is given the average annual income from various sources, over each five-yearly period of the first 40 years of the Society's existence; also the average annual expenditure over the same periods, on the Journal and the Library accounts, each separately, and in other ways collectively.

Income.

Five-year periods ending March 30th.	Entrance fees, subscriptions, compositions, donations.	Dividends.	Miscellaneous.	Legacies.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1846.....	183 5 0	—	—	—	183 5 0
1851.....	360 12 11	6 2 4	36 15 9	—	403 11 0
1856.....	333 1 2	10 13 10	80 9 4	—	424 4 4
1861.....	550 16 0	8 9 8	39 12 10	—	598 18 6
1866.....	736 0 11	24 16 3	26 13 5	—	787 10 7
1871.....	1024 15 5	72 5 11	57 2 5	—	1154 3 9
1876.....	1758 1 11	97 12 9	237 19 5	—	2093 14 1
1881.....	2047 15 7	194 6 5	360 1 10	568 1 0	3170 4 10
1881–2....	2396 1 6	231 7 3	407 8 6	—	3034 17 3
1882–3....	2444 3 6	245 10 1	383 11 6	—	3073 5 1

Expenditure.

Five-year periods.	Journal.			Library.			Miscellaneous.			Investments.			Total.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
1846.....	45	11	4	10	3	11	39	1	7	—			94	16	10
1851.....	187	15	5	18	3	4	133	14	5	99	12	3	439	5	5
1856.....	179	13	1	32	3	2	245	19	0	—			457	15	3
1861.....	219	8	1	49	14	1	168	19	6	65	17	3	503	18	11
1866.....	352	2	4	73	17	6	177	4	10	145	14	6	748	19	2
1871.....	409	14	6	89	12	9	230	13	6	310	0	6	1040	1	3
1876.....	1189	13	8	149	18	11	650	14	8	93	15	0	2084	2	3
1881.....	1654	9	3	330	2	5	508	2	11	712	13	11	3205	8	6
1881 2....	1733	11	10	233	4	11	526	9	7	324	7	6	2817	13	10
1882–3....	1944	13	3	307	9	10	517	5	0	530	0	0	3299	8	1

Thus our income from entrance fees, subscriptions, compositions, and donations, has increased from an average of under £200 over the first five years, to over £2000 over the last five years of the first 40; and in the past year it amounted to over £2400. Our annual income from dividends, which was nothing in the first five years, now amounts to nearly £250; whilst miscellaneous items, including the sale of the Journal, &c., amount to nearly £400. We have also received during the eighth five years a sum of £2840 5*s.* in three legacies (from Mr. Dirck £840 5*s.*, from Mr. Lambert £1000, and from Mr. Ellis £1000), giving the average per annum over the period of £568 1*s.* shown in the table.

As to the expenditure: on the important item of the Journal it averaged little more than £45 per annum over the first five years, more than £1650 over the last five years, and in the past year it was not far short of £2000. This expenditure increased very rapidly during the last two five-yearly periods. From the amounts of cost given, there have to be deducted the proceeds of the sale of the Journal. But this largely increased and increasing item of our expenditure must be looked upon with great satisfaction, as indicating very important work accomplished, and widely spreading usefulness.

The expenditure on the Library is on a very much smaller scale than that on the Journal, but it also has very considerably increased. The average annual expenditure on the Library was little over £10 over the first five years, and it exceeded £330 over the eighth five years; but it has been rather less since. This increase must also be considered as a source of gratification to the Fellows, as it speaks of much enhanced facilities for study.

Of the other items of expenditure, I have nothing to say, excepting

that they show a constantly-increasing activity in our proceedings. One more item of satisfaction may be noted, namely, that, notwithstanding our greatly increased expenditure in the maintenance and furtherance of the objects of the Society, we are still able gradually to add to our store of invested capital.

As bearing upon the progress of the Society in the past, and its probable prospects in the future, it was my intention to give, as far as possible, a statistical view of the vast development of chemical education in this country, since the date of its foundation; but although I have been kindly provided with some material for the purpose, the only result has been that I have found it quite impracticable, with the time at my command, and with due regard to the proper limits of my address, to treat the subject in that way. I can only direct attention, in general terms, to the great advances that have been made; and it is the less necessary to do more, since the majority of the Fellows are well aware of the facilities now at the command of the chemical student.

By way of illustration of the change which has taken place, I may mention that my own first session in a chemical laboratory was in 1838–9, that is, a few years before the foundation of this Society, under the late Professor Thomas Thomson, of Glasgow. There were only three laboratory students besides myself, one of whom, the late Dr. Stenhouse, is well known to the Fellows of this Society by his researches; and I had the advantage of meeting him again in the Giessen Laboratory in 1840. There was, I believe, at that time no systematic course of training in this country, first in qualitative, and then in quantitative work. For myself, after a little instruction in the use of the balance, I was at once set to analyse the minerals Prehnite and Stilbite, and was referred to books for method. The Professor was, however, always ready to give kind attention and assistance to the student when required. Dr. James Young informs me that what is known as a "practical class" had already before that time been established at the Andersonian College, Glasgow, by the late Professor Graham; and that he established one at University College, London, on going there about the year 1837. Such a class was in active work when I was at University College in the Sessions of 1839–40, and 1840–1. There can be no doubt, however, that the training for research was much less systematic then than it has been since; though a glance at the list of the early Fellows of this Society is sufficient to show that good chemists were nevertheless so trained.

It was at the anniversary meeting of the Society in March, 1847, that the President, Professor Graham, referred to the recent establishment in London, of chemical laboratories, expressly designed to further

the prosecution of original research, adding that—"The new laboratories of the College of Chemistry, and of the two older Colleges of the London University, now offer facilities for practical instruction and research not surpassed, we believe, in any foreign school. They already exhibit their efficiency, and claim our grateful recognition in the persons of new and promising contributors to our Memoirs."

Up to this time, it had been alleged that Organic Chemistry was neglected in these islands; and certainly from about the date just quoted, research in that department received a great impetus in this country. At the same time, it is only due to say that prior to the establishment of these new laboratories, the records of our Society bear testimony to the activity of a few of our countrymen in such research. Among these the name of Stenhouse has the most prominent place, but the names of Schunck, W. Gregory, and J. Blyth should not be omitted. Whilst referring to the earlier volumes issued by the Society, I may perhaps mention in passing, though the service rendered may not be much more than that of the organ-blower to the performer, that the third paper in our "Memoirs" (1841), is a translation by myself of Redtenbacher and Liebig's paper—"On the Atomic Weight of Carbon"—a fact which I had entirely forgotten until looking up the particulars above alluded to.

Not only have the facilities for training in, and for the prosecution of, research, been very greatly augmented in the three Institutions referred to by Graham, since that date, but such facilities have long been provided in connection with numerous other Schools in the Metropolis. Our two older Universities, Oxford and Cambridge, have also their well-appointed laboratories and schools of research. Very great advances have been made in the same direction in connection with the Scotch Universities, as well as with both the older and the newer Colleges in Ireland. To add to this, we have chemical schools of rapidly increasing influence in almost every important centre of population or industry in England. Thus, we have the Victoria University, with its active and efficient Schools of Chemistry at Manchester and Leeds, from both of which our Society receives valuable communications. Then, at Bristol, at Birmingham, at Newcastle, at Sheffield, and at Nottingham, there are very promising institutions, in which the Chemical Department is conducted by Fellows of this Society, well known by their original work. Moreover, almost every Public School now recognises the necessity of some training in chemistry. Besides all this, we have a rapidly developing system of instruction in the technical applications of chemistry, both by lectures and laboratory practice. As prominent examples of institutions specially designed to provide such instruction, may be mentioned the School of Mines; the School of Technical Chemistry in connection with Ander-

son's College, Glasgow, founded and endowed by Dr. James Young*; and the Schools of Chemistry already established, and to be established, under the auspices of the City and Guilds of London Institute for the Advancement of Technical Education.

With this great development in the past, and all that it promises in the future, there is surely every reason for believing that our Society must increase, both in the number of Fellows, and in the number and value of the papers communicated to it. There have, it is true, been two offshoots from the Society during the last few years, viz., the Institute of Chemistry, representing professional chemists as such, and the Society of Chemical Industry, each with its meetings and its publications. But, so far as I know, neither has prospered at the expense of the number of, or of the work accomplished by, our own body. It is true that, according to the terms of our Charter, one object of our Society is, "the general advancement of chemical science, as intimately connected with the prosperity of the manufactures of the United Kingdom, many of which mainly depend on their application of chemical principles and discoveries for their beneficial development, and for a more extended and economical application of the industrial resources and sanitary condition of the community." Yet, it may be a question whether the valuable papers which have been presented to and published by the Society of Chemical Industry would have reached our own Society at all, or whether, on the other hand, they have not had their origin altogether under the auspices of the new Society, and are, so far, a pure gain rather than a transference of usefully directed energy. Nor must we overlook the fact, that the number of papers read at our own meetings has, upon the whole, steadily increased in recent years, notwithstanding the large number of chemical papers presented to the Royal Society. In fact, the experience of that Society, like that of our own so far, goes to show that any loss of contributions that may arise from the establishment of departmental Scientific Societies is amply compensated by the increased activity of research.

In this connection, mention should be made of the fact that a considerable number of papers have been received and published by the Society, recording the results of investigations made by the aid of grants from the Research Fund of our Society, established in 1876. Some of the results of the researches so made have, however, been published elsewhere; but, on the other hand, we have received communications resulting from investigations conducted with aid from the Government Research Fund administered by the Royal Society.

A further measure of the increasing activity of research in this

* It is understood that in building, equipment, and endowment, Dr. Young has expended about £20,000.

country is the greatly increased space devoted in our annual volume to the "Proceedings" and "Transactions." Thus the average annual number of pages so devoted during each five-yearly period from the commencement to 1881 inclusive has been 187, 344, 170, 290, 460, 458, 363, and 673, falling however last year, 1882, to only 438.

Of the activity of chemical research on the Continent of Europe little need be said. Many of our Fellows have studied in Continental laboratories, and those who have not are able to form a very clear idea of the variety, extent, and value, of the work accomplished, from the Abstracts published monthly in our Journal. As indicating the growing activity of chemical research generally, it may be mentioned that the number of Abstracts and Titles of Papers given in our Journal was more than 1600 in 1878, nearly 1800 in 1879, and more than 1800 in 1880. In the first year, 1870–1, they occupied 1015 pages, over the next five years the average was 969 pages, over the next five years 1077, and in the last volume, that for 1882, 1340 pages, arranged under the headings of—

General and Physical Chemistry;
Inorganic Chemistry;
Mineralogical Chemistry;
Organic Chemistry;
Physiological Chemistry;
Chemistry of Vegetable Physiology and Agriculture;
Analytical Chemistry;
Technical Chemistry.

Of the extent of the arrangements for chemical education and chemical research on the American continent, much less is known in this country. It happens that I made a rather extended, but much too hurried a tour in America last autumn; and mentioning some of the facts I had there observed to Officers of this Society, I have been asked if I could not give some account of the condition of things in my Address.

I may premise that a special object of my journey was to communicate a joint paper by Sir J. B. Lawes and myself at the meeting of the American Association for the Advancement of Science held at Montreal, in August. I then visited the Canadian Province of Manitoba, and some of the Central and Western States of the Union, to acquire information as to the extent, and especially as to the fertility, of the vast areas of newly settled, or as yet unsettled lands, to which we look, not only as an outlet for our surplus European populations, but as a source of supply of a material amount of the food of those who remain behind.

Naturally, however, I took the opportunity of visiting Schools of

Chemistry whenever I was able to do so. I was struck with the provision already made in some States of the Union, that were hardly if at all settled when this Society was established, and which have only been within a comparatively few years brought into the Union as States. For example, and only as example, I may mention that in the State of Minnesota, only brought into the Union as a State in 1858, there is, at Minneapolis, the University of Minnesota, with both Professors and Students of both sexes; and there I found a laboratory with working room for 64 students, under the direction of Professor Dodge, who was educated in laboratories on the Continent of Europe, and in England. Again, in California, which was brought into the Union as a State only in 1850, I found at Berkeley, a few miles from San Francisco, the University of California, with its several laboratories for General Chemistry, and its laboratory for Agricultural Chemistry. The Professor of Chemistry, Dr. Rising, had studied in European laboratories, and the Professor of Agricultural Chemistry, Dr. Hilgard, was engaged in investigations on soils.

Of what is doing in the Eastern, and some of the Southern States much more is known. But feeling that my own personal observations had been far too limited in extent, and were made far too hurriedly, to enable me to give an account of any value, I applied to Sir Alexander Galt, the High Commissioner for Canada, and to His Excellency Mr. Lowell, the American Minister in London, for any further information that might be available. From both I have received the most courteous attention and most substantial aid. I am also much indebted to Mr. Hoppin, the Secretary of Legation of the United States, to the Hon. John Eaton, Commissioner of Education at Washington, and to Mr. Colmer, the Secretary to the High Commissioner for Canada, for their very cordial co-operation in the matter. Indeed, the records supplied to me are far more copious than I have either time or space at all adequately to summarise. Still, the brief notice I am able to give of the progress of Chemistry on the other side of the Atlantic, will, I trust, be not altogether without interest, and will at any rate serve the purpose of directing attention to the subject, and to sources of further information.

Referring first to Canada, any information respecting the provision for scientific teaching there cannot fail to be of special interest at the present time, in view of the proposed visit of the British Association for the Advancement of Science to Montreal next year. No printed official reports on the subject have, however, been furnished to me, and whether such exist I am not aware. The facts I am able to give are from returns in answer to a form of questions I submitted, copies of which were kindly forwarded to the proper authorities for reply.

At *Ottawa*, the Capital of the Dominion of Canada, there is the

University of Ottawa, established in 1866, with laboratory accommodation for 20 students.

At *Montreal*, in the *Province of Quebec*, there is the McGill University, chartered in 1821, with its Faculties of Arts, Applied Science, Medicine, and Law. Chemistry is taught in Arts and Applied Science by Dr. B. J. Harrington, and in Medicine and Applied Science by Dr. G. P. Girdwood. There is laboratory accommodation for 25 Arts and Applied Science Students, and for 40 Medical Students. In Arts and Applied Science 60 Students take chemistry, of whom about half work in the laboratory, chiefly the more advanced. In Medicine, at present 116 are taking chemistry, of whom again nearly half work in the laboratory.

At *Quebec* itself, there is the Laval University, including a Medical Faculty, but the Faculty of Arts is not yet organised. There is a spacious chemical laboratory, with complete apparatus, &c., but no further information is given.

In the Province of *Ontario* there are numerous Schools of Chemistry.

At *Toronto*, there are University College and the School of Practical Science combined. These institutions include the various departments of general, medical, and technical instruction. The Professor of Chemistry is Dr. Pike, a Fellow of this Society. There is laboratory accommodation for 60 students, and there are a lecture and a laboratory assistant. There is also the School of Medicine, established in 1843, with laboratory accommodation for 24 students, and there is Trinity College, established in 1852, with laboratory accommodation for 30 students.

At *Kingston*, there is Queen's University College, established in 1840, where there is provision for 12 laboratory students ; and there is the Royal Military College with accommodation for 12, which it is proposed to increase to 25.

At *Cobourg*, there is the Victoria University, established in 1841, with a Professor and Assistant Professor of Chemistry, and one assistant ; and there is laboratory accommodation for 30 students.

At *Belleville*, there is the Albert College, established in 1857, with a Professor of Chemistry, but what laboratory accommodation is not stated.

At *London* (Ontario), there is the Western University, chiefly a Medical School, established in 1882. There is at present laboratory accommodation for 25 students, which it is intended to raise to 50.

In *Nova Scotia*, there is the Dalhousie College and University, at Halifax, with its Academic, Scientific, and Medical departments, and provision for 13 laboratory students.

In *New Brunswick*, the College of New Brunswick was founded at Fredericton in 1800 ; in 1828 it was, by Royal Charter, entitled King's

College, Fredericton; and in 1860, by amended Charter, the University of New Brunswick. Laboratory accommodation is provided for six students.

At *Winnipeg*, in the very recently and as yet only partially settled Province of Manitoba, I am informed there is already provision made for the teaching of chemistry, and that there is laboratory accommodation for six students.

In *Prince Edward Island* there is provision for elementary instruction in chemistry in some of the higher schools; but none other is provided. Nor, so far as my information goes, is there as yet any provision made for the teaching of chemistry in the far distant and recently settled province of British Columbia. But as I believe the Government have reserved lands along the line of the Canadian Pacific Railway to serve as endowment for educational purposes, it is to be expected that a knowledge of chemistry, the application of which must have such a direct influence on the economic development of the country, will in time be furnished by aid from this source.

Next, referring to the United States, although I travelled over about 11,000 miles on the American Continent, I crossed the borders of little more than half the 38 States of the Union; and was able to visit the scientific institutions of only a few of these. I have, however, been supplied with official information, both printed and written, as to the provision for teaching chemistry in nearly all the States. In almost every State there is provision made in Universities or Colleges, and also in secondary and High Schools and Academies.

I need only make reference to the institutions of the higher order. In many of the States, especially the more recently settled ones, the education in chemistry is in connection with an "Agricultural," a "Mechanical," an "Industrial," a "Mining," a "Medical," or a general "Technical" department. In such cases, therefore, the object is directly practical; and the training is little calculated to lead the student into the lines of original research. In almost every case, however, provision is made for work in the laboratory, as well as for instruction by lectures; and an original investigation is sometimes required to graduate.

I have already referred to the provision made at the Universities of Minnesota and California, and I will give one or two more examples of institutions where arrangements of the kind are comparatively recent.

Thus, it is stated that in the *Illinois Industrial University* at Urbana, there is laboratory accommodation for from 200 to 300 students; and the full course for a degree in the school of chemistry includes instruction in chemistry as follows:—First year, chemistry with laboratory practice (qualitative analysis), organic chemistry, and quantitative analysis. Second year, agricultural chemistry, with analysis; pre-

paration of salts, acids, &c. Third year, ultimate organic analysis, blowpipe analysis, assaying, both dry and humid, photography, including the preparation of photographic chemicals. Fourth year, gas analysis, analysis of waters, toxicology, including the micro-chemistry of poisons, original research, and thesis. The chemical portions of the course are, however, variable, according to the future objects of the student.

As another example, the *Iowa State Agricultural College* may be taken. It is stated that there is laboratory accommodation for 100 students, each provided with gas, sink, &c., and those engaged on quantitative work, with filter-pumps. The instruction is largely by lectures; but the beginner spends two afternoons a week in the laboratory, at qualitative analysis; quantitative analysis next follows; then volumetric methods, food analysis, and instruction in organic chemistry, both practical and theoretical. In the senior year, lectures twice a week on agricultural chemistry, lectures on food, the value and the use of the proteïn bodies, carbohydrates, fats, salts, &c. Special work is in the line of soil analysis, and the analysis of corn and grasses.

The foregoing examples may, I think, be taken as giving a fair idea of the character of the arrangements for the teaching of chemistry in the State or other institutions of the higher class, in many of the Central, Southern, and Western States; but further information will be found in the official document, entitled "Circulars of Information of the Bureau of Education No. 6, 1880, Washington."

I must go a little more into detail in reference to some of the institutions in the Eastern and South-Eastern States.

The Sheffield Scientific School, Yale College, New Haven, Connecticut.—In the history of American Science, Yale has played a very prominent part. Previous to 1770, chemistry was taught by tutors, and only became a regular subject of instruction about the beginning of the present century, the elder Silliman being appointed professor in 1802, a position which he held for nearly 50 years. In 1818 Professor Silliman issued the first number of the *American Journal of Science*, which still flourishes, and is well and favourably known in this country. In 1846 two professors, J. P. Norton, and B. Silliman, Junior, were appointed. This commenced the Scientific School, which, by the gifts of Mr. Sheffield, in 1859 and later, was placed upon a permanent basis. In 1863, the school received the National Land Grant, and became "The College of Agriculture and Mechanic Arts of Connecticut." Professor S. W. Johnson has now for many years been at Yale, and on my visit there he kindly devoted himself to showing me all that was likely specially to interest me in the arrangements.

The Laboratories are:—

1. A laboratory for elementary chemistry for the freshman class.
2. A laboratory for qualitative analytical chemistry.
3. A laboratory for quantitative analytical chemistry and various chemical investigations.
4. A laboratory for physiological chemistry.

An additional room in the basement is fitted up with furnaces and apparatus for assaying of ores in the dry way. Further, the determination of minerals is carried on in a laboratory arranged specially for that purpose.

The laboratories are well fitted, but some of them are too small. At present 41 students work in the laboratories for analytical and physiological chemistry;—30 undergraduates in the courses of chemistry, biology, and agriculture, eight graduates, and three special students. They work four hours a day, under the supervision of four instructors. The laboratory accommodation is about to be increased.

Students enter the school with various objects; with a view to agriculture, metallurgy, mining engineering, pharmacy, or other professions. An increasing number study chemistry as a pure science, deciding to make it a permanent pursuit, in the expectation of becoming instructors, or analytical chemists, for which the liberal amount of time devoted to laboratory practice in chemical analysis is specially advantageous.

The Freshman receives preparatory instruction in chemistry. In the junior year the instruction is by text-books and recitations, with four hours a day in the laboratory five days a week, one being devoted to mineralogy. The work is partly experimental in organic chemistry—the synthetic preparation of organic compounds, &c. In the senior year also four hours a day are devoted to the laboratory. The student may gain experience in the assaying of ores, in the analysis of some particular class of products, or he may devote his time to original research. The facilities for graduate students are constantly increasing. The laboratories for analytical and physiological chemistry are open seven hours daily for their use. After suitable preparation, original investigation is encouraged. Work of this kind has proved to be a most valuable training, and has resulted in the production of some contributions to science of considerable value.

Harvard University, at Cambridge, Massachusetts.—At Harvard College, Josiah P. Cooke is the Professor of Chemistry and Mineralogy; and C. L. Jackson and H. B. Hill are Assistant Professors of Chemistry. There is also an Instructor, and there are three Assistants. Here I was fortunate enough to meet Professors Asa Gray, Horsford, J. P. Cooke, C. L. Jackson, Wolcott Gibbs, and others.

The laboratory accommodation consists of a qualitative laboratory with 100 desks; a quantitative laboratory with 24 desks; an organic chemistry laboratory with 12 desks; and a mineralogical laboratory for 24 students. There are a room of constant temperature for gas analysis, a furnace room, a balance room, and library, a larger and a smaller lecture room, and three private laboratories.

There is a summer course in chemistry for teachers of both sexes, which is largely attended. The subjects taught are: General chemistry, qualitative analysis, quantitative and organic analysis, the preparation of chemical substances, mineralogy, crystallography, blowpipe analysis. Every facility is given in the laboratory.

The teaching of chemistry in Harvard University dates from 1782, when Aaron Dexter was appointed Professor. He occupied the chair until 1816, and was succeeded by Professor John Gorham, who held it till 1827. In 1819, Dr. Gorham published the first systematic work on chemistry by an American author.

In 1847, the *Laurence Scientific School* was organised, and Professor E. N. Horsford inaugurated a system of laboratory instruction. In 1863, Professor Wolcott Gibbs succeeded Professor Horsford. Up to 1871, when the Chemical instruction was consolidated with that of the College, and Dr. Gibbs became Professor of Physics, the school was the foremost in chemistry in the country.

In 1850 Dr. Cooke was elected Erving Professor in Harvard College. Laboratory instruction was first recognised as a part of the College course in 1859, when the present laboratory building was completed. Many researches in chemistry have been published from Harvard University.

Cornell University, at Ithica, State of New York.—Here I was very kindly received both by President White, and Professor Caldwell. C. A. Schæffer is Professor of General and Analytical Chemistry; G. C. Caldwell of Agricultural and Analytical Chemistry; C. H. Wing of Organic Chemistry; A. A. Breneman of Industrial Chemistry; and there are several assistants.

The laboratory accommodation is as follows: 1, the general laboratory for introductory and qualitative work; 2, a special laboratory for general quantitative analysis; 3, a special laboratory for agricultural and medical quantitative analysis; 4, a blowpipe room; 5, an assay room; 6, a room for spectroscopic and other optical work in chemistry; 7, a room for weighing and for the analysis of gases; 8, a reading room, well provided with chemical journals and other works of reference. Hydrogen and sulphydric acid are carried to the different rooms from generators. Richards' jet aspirator is used for water blast and filter-pumps, one of the latter being attached to every working table in the quantitative laboratories. These rooms are also

fitted with steam evaporating baths, drying closets, self-regulating air-baths at different temperatures, batteries for electrolytic determinations, and so forth. A new laboratory building was about to be occupied, including Museum, Library, Laboratories, Lecture rooms, &c., with the most recent appliances for chemical work.

University of Pennsylvania, at Philadelphia.—There are numerous schools of chemistry in Pennsylvania, but I can only refer to that of the University at Philadelphia. Dr. F. A. Genth, who kindly showed me the Laboratories, is the Professor of Chemistry and Mineralogy. G. A. König is Assistant Professor and Instructor in Metallurgy and Technical Chemistry; S. P. Sadtler Assistant Professor and Instructor in General and Organic Chemistry; and E. F. Smith Assistant in Analytical Chemistry. The laboratories are exceptionally fine, and fully equipped for all fields of chemical instruction. There is also a chemical museum. Numerous original investigations have been published by Professors Genth, Sadtler, and Smith. Chemistry has been taught here for more than a century in a limited way; but the present system of teaching was established in 1872.

There is also a very large Medical School in connection with the University. I had the good fortune to meet Dr. Wormley, the Professor of Chemistry and Toxicology, and Dr. J. Marshall, the Senior Assistant; there are also several other assistants. The laboratories of this department are very large and well appointed. There is already bench-room for 144 junior and 144 senior students to work at one time; and there is space for the fitting up of 72 places more in each of these laboratories. Thus there is at present laboratory accommodation for 288 students, which can be extended for 432.

College of New Jersey, at Princeton, State of New Jersey.—It was here that the first regular professorship of chemistry was established in America. Dr. John McClean was appointed in 1795; and it was in his laboratory that the elder Professor Silliman first became acquainted with experimental chemistry. In physics, Princeton won distinction from the researches of the late Professor Joseph Henry, who was professor there prior to the organisation of the Smithsonian Institution at Washington. J. S. Schanck is now the Professor of Chemistry, and H. B. Cornwall, Professor of Analytical Chemistry and Mineralogy. General inorganic chemistry, blowpipe analysis, qualitative analysis, quantitative analysis, volumetric work, assaying, applied chemistry, and organic chemistry, are taught. Here I received every attention from Principal McCosh and Professor Cornwall.

University of Virginia, at Charlotteville.—Dr. J. W. Mallet, F.R.S., and also a Fellow of our Society, is the Professor of Chemistry; and Professor F. P. Dunnington has charge of the laboratory work. There is a course of general or scientific chemistry, and a course of

industrial or applied chemistry; also a short course in agricultural chemistry. The laboratory is specially built, and is capable of accommodating 50 students. There is a class of qualitative and a class of quantitative analysis. Students are strongly urged to undertake original research; and the result has been that a considerable number of original memoirs have been published from this laboratory. Special subjects are also taught, such as assaying, technological research, &c.

Johns Hopkins University, at Baltimore.—On the occasion of my visit new laboratories were in course of construction, and Professor Remsen kindly explained to me the existing and proposed arrangements as far as possible. Dr. Morse is Assistant Professor; there are several assistants; and Professor J. W. Mallet, of the University of Virginia, lectures upon Technological Chemistry. Courses are given in general chemistry, laboratory work, organic chemistry, analytical chemistry, the history of chemistry, on waste products of chemical manufacture, and the chief branches of chemical industry. The reading and discussion of current chemical journals are also a feature in the training. Professor Remsen, with the assistance of several other chemists, edits the "*American Chemical Journal*," in which the results of numerous researches made at this University, and elsewhere, are published. Research is regarded as a very essential part of the course in chemistry, and the teaching is so directed as to lead every student to recognise its importance. Constant reference is made to sources of information, to familiarise the student with the literature of chemistry, and that he may acquire a clear idea of the way in which different subjects have been built up. The object in view is, in fact, not only to make skilful workers, but clear thinkers.

I will conclude this reference to the arrangements for the teaching of chemistry in the United States, by a brief notice of two of the most important Technical Schools:—

Massachusetts Institute of Technology, at Boston.—Students from the Boston University receive their education in chemistry here. The following list of the teaching staff will give some idea of the comprehensive character of the scheme of instruction. The Professor of Metallurgy and Industrial Chemistry, J. M. Ordway; Professor of Organic Chemistry, J. M. Crafts; Professor of General Chemistry, W. R. Nicholls; Professor of Analytical Chemistry, C. H. Wing; Instructor in Chemistry and Mineralogy in the Women's Laboratory, Ellen H. Richards. There are besides several assistants. Assaying, and biology in its chemical aspects, are also taught.

On the occasion of my visit, I was fortunate enough to find Professor Ordway, who kindly showed me through the Institution. The first laboratory visited was that for women, where a number of

students were at work. The training of women in laboratory practice is indeed an important feature in this Institution. Courses of chemistry, open to both sexes, were commenced in 1867. A few years later the first course in quantitative analysis open to women was given. In 1876 new laboratories were opened; and in the first two years 43 women availed themselves of the instruction provided; about two-thirds of whom were either already teachers, or were preparing to teach.

The laboratories for qualitative and quantitative analysis were established in 1865, the laboratory for organic chemistry in 1877, and that for industrial chemistry in 1878–9. New laboratories were in course of construction at the time of my visit. At several institutions I found arrangements for the training of students in the working of ores on a somewhat practical scale; and I think it was here, as well as elsewhere, that I saw, for example, appliances for the working of half a ton of gold-bearing quartz, and in such cases the student was expected to get a good practical result.

Columbia College and School of Mines, New York City.—This School was opened in 1864; a new building, with extensive laboratories, was completed in 1874; and considerable extensions were in progress at the time of my visit. There are five regular courses of study: 1, mining engineering; 2, civil engineering; 3, metallurgy; 4, geology and palæontology; 5, analytical and applied chemistry. The Professor of Chemistry is Dr. C. F. Chandler, a Fellow of this Society, who kindly showed me over the Institution; and there are six or more instructors and assistants. General inorganic chemistry, stoichiometry, qualitative analysis, quantitative analysis, and blowpipe practice, are required in all the courses. Assaying is taught to the students in mining, metallurgy, and chemistry. In the geological and chemical courses, organic chemistry is studied.

For analytical chemistry there were three laboratories, one for qualitative, one for quantitative analysis, and a third for assaying; but as already intimated, the laboratory accommodation was undergoing very considerable enlargement.

In the third year, the subjects taken up by all the students in applied chemistry are :—1. Air (nature, sources of contamination, sewer gas, plumbing, drainage, disinfection, ventilation). 2. Water (composition of natural waters, pollution, disposal of sewage and house refuse). 3. Fuel, and its applications. 4. Artificial illumination (candles, oils and lamps, petroleum, gas and its products, electric light). 5. Lime, mortars, and cements. 6. Building stones (decay and preservation). 7. Timber and its preservation (pigments, paints, essential oils, varnishes). 8. Glass and ceramics. 9. Explosives (gunpowder, guncotton, nitro-glycerine, &c.).

In the fourth year the studies in analytical and applied chemistry are:—1. Chemical manufactures (acids, alkalis, and salts). 2. Food and drink (milk, cereals, starch, bread, meat, tea, coffee, sugar, fermentation, wine, beer, spirits, vinegar, preservation of food, tobacco, &c.). 3. Clothing (textile fabrics, bleaching, dyeing, calico printing, paper, tanning, glue, india-rubber, gutta-percha, &c.). 4. Fertilisers. 5. Organic chemistry (laboratory practice). 6. Assaying (ores of lead, silver, gold, platinum, tin, antimony, bismuth, copper, nickel, cobalt, iron, mercury, and zinc; also gold, silver, and lead bullion mattes, slags, &c.). 7. Metallurgy (copper, lead, silver, gold, zinc, tin, mercury, &c.). 8. Economic geology (theory of mineral veins, ores, deposits and distribution of iron, copper, lead, gold, silver, mercury, and other metals; graphite, coal, lignite, peat, asphalt, petroleum, salt, clay, limestone, cements, building and ornamental stones, &c.). 9. Dissertation.

It will be seen that the course of study in this Institution is almost exclusively technical, being designed to train analysts and technologists rather than purely scientific investigators. A considerable amount of original research has, however, been conducted by the graduates, the results of some of which have been published.

With reference to the foregoing account of the arrangements for the teaching of chemistry, and for chemical research, on the American Continent, whilst by some it may be thought to be inappropriately long for embodiment in the Address of the President of the Chemical Society, it must, on the other hand, be looked upon as entirely inadequate to convey an idea of the extent of the provision for such teaching. My apology must be, on the one hand, that it was suggested to me that I should say something on the subject, and, on the other, that I have not had time, nor would it be suitable to appropriate space, for any more complete or detailed statement. Such as it is, I hope it will not be without interest, as giving some indication of the progress in the teaching of our science, and of the promise of original research, on the other side of the Atlantic. As already said, I must refer those who wish to know more to the official document which has been cited, whilst the manuscript supplement, which has, with great courtesy and much trouble, been drawn up for me, remains available for reference whenever further use can be made of it.

Since the last Anniversary Meeting, the Society has lost by death nine Fellows, and one Foreign Member. On the Home list, the losses are,—Mr. John Gray, Mr. Dugald Campbell, Mr. John Joseph Beaumont Jeanneret-Grosjean, Mr. Alexander Jesseman, Dr. George A. C. Pearce, Dr. G. W. Septimus Piesse, Mr. Edgar Wilcock, Professor

Henry John Stephen Smith, and Mr. Frank Hatton. On the Foreign list we have lost Frederic Wöhler.

Mr. John Gray, a native of Inverurie, Aberdeenshire, died suddenly on March 23, 1882, at the early age of 24. He had only a few weeks previously been elected a Fellow of the Chemical Society. Mr. Gray received his chemical education at South Kensington, and in the laboratory of the Inland Revenue Department at Somerset House. He was a member of the analytical staff in that laboratory at the time of his death; and he was regarded by his superiors and his colleagues as a young man of great promise.

Mr. Dugald Campbell, Analytical and Consulting Chemist, of Quality Court, Chancery Lane, died at his residence, in Holland Road, Kensington, on May 12, 1882, at the age of 64. Mr. Campbell was a younger son of a good Scotch family, and was educated in Edinburgh. When quite a young man he went to Australia. On his return to this country, after a few years' absence, he devoted himself to the study of chemistry under the late Professor Graham, at University College, London; where he subsequently held the post of Demonstrator of Chemistry for a few years. Whilst in that position, he published (in 1869), his "Practical Text-book of Inorganic Chemistry," which had a considerable circulation at the time. Early in his career, he began to pay special attention to the subject of water analysis; and he assisted Dr. Clark, of Aberdeen, in his experiments on the process of water purification, with which his name is associated. He also paid much attention to the chemistry of sewage, and he was frequently consulted by sanitary authorities, and by the promoters of Waterworks. He was also frequently consulted by the Inland Revenue Department on questions of adulteration. Many years ago he conducted, in conjunction with Professor Graham and Dr. Stenhouse, an elaborate series of experiments with reference to the adulteration of coffee, the report of which was published in our Journal; to which he also contributed papers, "On the Application of Sewage to Agriculture," and "On the Source of the Water in the Deep Wells of the Chalk under London." To the *Philosophical Magazine* he contributed a short paper "On the Presence of Arsenic in River Sand," and in 1851 he communicated a paper to the British Association, "On the Effect of Magnesia on the Soap Test." Mr. Campbell held the appointment of Chemist to the Brompton Hospital. He was entrusted by the Commissioners of Patents with the preparation of several volumes of their "Abridgments," among which may be mentioned those relating to "India-rubber and Gutta-percha," "Gas," "Medicine," "Oils, Fats, and Candles," "Acids, Alkalis, and

Salts," and "Sugar." He was also a frequent scientific witness in the Law Courts. Some years ago he was a Member of the Council of the Chemical Society, and more recently of the Council of the Institute of Chemistry. Mr. Campbell had been in a precarious state of health for some months, and the proximate cause of his death was an attack of paralysis.

Mr. John Joseph Beaumont Jeanneret Grosjean, son of Pierre Frederic and Eliza Jeanneret Grosjean, was born in Oxford Street, London, on May 3, 1843. He was educated at King's College School, where he took a prize for general proficiency. In 1862 he entered at Lincoln College, Oxford, being intended for the Church. Theological difficulties arising, he left Oxford after keeping one term; and in 1863 he entered the Regent's Park Baptist College. Whilst there he matriculated at the London University, taking honours in mathematics.

Mr. Grosjean finally gave up the idea of becoming a minister, and in 1864 entered as a student at the Royal College of Chemistry, under Dr. Hofmann. In 1866 he became assistant in the water-analysis laboratory under Dr. Frankland, and was soon distinguished by the care he took to render his work accurate. In August, 1867, Mr. Grosjean was appointed assistant to the Professor of Chemistry at the Royal Agricultural College, Cirencester. Here he remained two years. His patient assiduity in work, and his love of accuracy, were conspicuous, both in his teaching of the students and in his analytical and research work for Professor Church. During his stay at Cirencester he was engaged in investigations connected with turacin, namaqualite, cyclopic acid from Boer tea, oskolite, cornwallite, and ancient bronzes.

In the summer of 1869 Mr. Grosjean was engaged by Mr. (now Sir) J. B. Lawes, to proceed to Sicily to establish the manufacture of citrate of calcium at Palermo. Concentrated lemon juice had hitherto been the chief material employed by citric acid manufacturers in England. Mr. Lawes thought that, instead of concentrating the juice in Sicily, it might prove more economical to precipitate the raw juice with chalk, and to dry and export the resulting citrate. The production of citrate in Sicily had previously been attempted, but without success. Mr. Grosjean, however, succeeded in overcoming all difficulties, and since his visit considerable quantities of excellent citrate have been exported from Palermo.

On his return to England, in the spring of 1870, Mr. Grosjean was appointed assistant chemist at Mr. Lawes's tartaric and citric acid factory at Millwall; and in 1873 he became the principal chemist there. Mr. Grosjean remained at Millwall till his death. He

there devoted himself heartily to the improvement of analytical methods, and to the study of manufacturing operations. One paper, "On the Determination of Tartaric Acid in Lees and Inferior Argol, with some Remarks on Filtration and Precipitation," was communicated to the Society during his lifetime (Trans., 1879, 341). A selection from his unpublished investigations has since been brought before the Society, and will be found in the Journal for the present year. Mr. Grosjean was, during four years, 1872—1876, an Abstractor for the Society's Journal. He was one of the original Fellows of the Institute of Chemistry. He was also an active member of the Society of Chemical Industry, and served on the Committee of the London Section. Through life he was afflicted with partial deafness, and frequently suffered from ill health. He died on June 11, 1882, of congestion of the brain. He leaves a widow and three children.

Mr. Alexander Jesseman was for some years a schoolmaster under the London School Board. He had always shown a great predilection for science, and especially for experimental chemistry, to which he devoted most of his leisure time. Leaving the service of the London School Board, he attended several of the courses at South Kensington, and Jermyn Street; after which he was appointed Science Lecturer at Dulwich College. Here his health, always delicate, gave way under the pressure of the duties which devolved upon him. He did not cease work until compelled to take to his bed, and he died on July 19th, 1882. Mr. Jesseman was elected a Fellow of this Society in December, 1880.

George A. C. Pearce, M.B., late of Dane's Inn, London, and Lee, Kent, died at Cadiz on October 5th, 1882, at the early age of 31, and was buried in the British Cemetery there. Dr. Pearce was educated at Bristol, and afterwards at Trinity College, Dublin; where he obtained the Medical Scholarship in 1871, and the Moderatorship in Experimental Science in 1872, the attainment of the latter honour being chiefly the result of his answers in chemistry. He further obtained the degree of Bachelor of Medicine in the University of Dublin in 1873, and the degree of Master in Surgery in 1874, coming first in the examination. In the summer of 1872 he became assistant, under Professor Apjohn, in the Laboratory for Medical Students, and Dr. Apjohn states that he gave both himself and the class the fullest satisfaction. Dr. Pearce was elected a Fellow of this Society in 1877. Of late years he was engaged in commercial pursuits, but he always retained a love for science, and was intending to resume medical practice, when disease of the lungs, which caused his death, became developed.

George William Septimus Piesse, Ph.D., was the son of the late Mr. Charles A. J. Piesse, chief clerk in the War Office. He was born on May 30th, 1820, and died on October 23rd, 1882. His early education was at a grammar school. He always exhibited a taste for science, and first gave serious attention to optics; and although he had served no apprenticeship to the business, he started life as a practical optician. Want of capital, however, prevented his continuing in this occupation. He next studied chemistry, attending the lectures of Professor Graham, at University College, London. For some time he practised as an analytical chemist; but giving this up, he again turned his attention to business, and became engaged, first with Messrs. J. and C. Atkinson, the perfumers, afterwards with the late Mr. Breidenbach, and finally joined with Mr. Lubin in founding the firm of Piesse and Lubin. This firm cultivated perfume-bearing plants in the South of France; and Dr. Piesse for many years endeavoured to promote the cultivation of such plants in the British Colonies, and succeeded in inaugurating numerous experiments in this direction, some of which are still in progress. Dr. Piesse early became an Associate of the Chemical Society, and was elected a Fellow in December, 1862. He contributed a paper, "Observations on Brewing," and another, "Certain Impurities in Commercial Sulphate of Copper." He was also the author of "The Art of Perfumery," "Piesse's Magic," "Laboratory of Chemical Wonders," "Twenty Letters on Farming," &c. He contributed the articles on Perfumery, and kindred subjects, to several Cyclopædias; and for a period of about 25 years he wrote the "Scientific and Useful" column in the *Family Herald*.

Mr. Edgar Wilcock received his early education at the City of London School; and he afterwards studied at the Royal College of Chemistry, South Kensington, for nearly four years. Although frequently in delicate health, he studied very diligently, and passed through the usual course of instruction, and the examinations of the College, with much success. In the Research Laboratory there, Mr. Wilcock conducted investigations, in conjunction with Dr. Japp, the results of which were published in their joint names, in the Society's Journal as follows:—"On the Action of Benzaldehyde on Phenanthraquinone, both alone and in presence of Ammonia" (1880 [i], 661); and "On the Action of Aldehydes on Phenanthraquinone in presence of Ammonia" (second notice, 1881 [i], 225). Mr. Wilcock was elected a Fellow of the Chemical Society in February, 1880; and at the time of his death, which took place on January 21st, 1883, he was Senior Assistant to Dr. Tidy.

Professor Henry John Stephen Smith, M.A., D.C.L., F.R.S., died

at Oxford on February 9th, 1883, in his 56th year. He was an Irishman by birth, but passed almost the whole of his life in England. His father was a member of the Bar, but died whilst his son was still quite young. Henry Smith was educated at Rugby, and afterwards at Oxford. He had left school in ill health, and was ordered to abstain from study for a year or more before he went into residence at Oxford. He was elected a scholar of Balliol in 1846, and in 1848 carried off the Ireland Scholarship. In the following year he obtained a Double First Class in Classics and Mathematics, and in 1851 he was elected to the Senior Mathematical Scholarship. He succeeded in due course to a Fellowship at Balliol, which he held till a few years ago, when he was elected to a Professor Fellowship at Corpus. In 1861, after the death of the late Professor Baden Powell, he was appointed his successor as Professor of Geometry.

Some years previously Mr. Smith devoted some time to the study of Chemistry, working in the Laboratory of the Ashmolean Museum, under Professor Maskelyne, who says that he went to work just like an old hand, having read the methods of separation, and made himself so well acquainted with them. He, however, took more interest in the general principles of chemistry than in its details. He became a Fellow of the Chemical Society in January 1854. By his death we have lost a very distinguished Fellow, though it was not in the domain of chemistry that his distinction was won. In the scientific world, not of England alone, he attained his greatest eminence as a mathematician. He was, however, a man of the widest acquirements, and of the widest sympathies with all branches of knowledge. He was a brilliant conversationalist, a good linguist, and in the best sense a consummate man of the world. He was associated with almost all the movements, scientific, political, and philanthropic, in Oxford, and was also much occupied with work of various kinds in London. For years he was a member of the Hebdomadal Council, and took an active share in all the legislative work of the University. In 1874 he succeeded the late Professor Phillips as Keeper of the University Museum, at Oxford. It was in this capacity that he became officially associated with the Professors of the various branches of science taught in that Institution. In the exercise of his duties he showed the greatest tact, judgment, and courtesy; and it was here that his influence in the furtherance of scientific education in the University was the most felt. He was a member of the late Royal Commission on Scientific Education; and it is believed that a considerable portion of its very able Report was drafted by his pen. He was also a member of the University of Oxford Commission, under Lord Salisbury's Act. Among his numerous engagements in London, he was Chairman of the Meteorological Council, which may be looked

upon, so to speak, as the Weather Department of the United Kingdom. He has served on the Council of the Royal Society, and also on the Council of the British Association. In fact, he possessed unusual capacity for practical business, and from his charm of manner, and tact, he exercised a unique personal influence, both in Oxford and elsewhere.

Professor Smith was the author of many mathematical papers of a high order, which are highly esteemed by mathematicians on the Continent, as well as in this country. Indeed, even since his death it has been announced that the Academy of Sciences (Paris) has awarded *ex equo*, to him and to M. Minskowsky, the "Grand Mathematical Prize."* Owing to his very full occupation in other ways, Professor Smith has given but little permanent literary work to the world. Among others, mention may be made, however, of an essay on the "Plurality of Worlds," reviewing the controversy between Whewell and Brewster, which was published in the first volume of the "Oxford Essays." Although Professor Smith was only in a limited sense a chemist, we may be proud that his name was on our list of Fellows, and we must deeply regret his premature death.

Mr. Frank Hatton was the only son of Mr. Joseph Hatton, Author and Journalist. The newspapers of Monday last (March 26th) record his death, in Borneo, whilst out elephant hunting, when his rifle caught in the bushes, and he was thus accidentally shot through the lungs, and died instantly. A career of something more than promise was thus closed at the early age of 22. Mr. Frank Hatton was educated at the College of Marcq, Lille; King's College School, London; the School of Mines, Jermyn Street; and the College of Chemistry, South Kensington. Dr. Frankland writes that he was one of the most genial, earnest, and talented students he has had in his laboratory; a most indefatigable worker, and a skilful manipulator. Dr. Frankland adds that Mr. Hatton's investigations on the influence of various gases on Bacteria constitute, in his opinion, a very valuable contribution to our knowledge of the principles of disinfection and of the arrest of zymotic disease. In a recent discussion at the Institution of Civil Engineers, Dr. Frankland referred to the researches in question as having proved that the only practicable material capable of destroying bacterial life in drinking water was spongy iron—a substance which had been applied on a large scale with marked success at the Antwerp Waterworks. Mr. Hatton was elected a Fellow of the Chemical

* Since the above was in type, it has been announced that the Academy, having found that Minskowsky had simply pirated Professor Smith's communication to the Royal Society in 1868, has declared the whole prize to have been gained by Professor Smith.

Society in December, 1879; and he has contributed three papers to our Journal—1. "On the Action of Bacteria on Gases" ([i], 1881, 247—258). 2. "On the Oxidation of Organic Matter in Water by Filtration through various Media; and on the Reduction of Nitrates by Sewage, Spongy Iron, and other Agents" ([i], 1881, 258—276). 3. In conjunction with Dr. Hodgkinson, "On the Reduction of Cinnylic Alcohol" ([i], 1881, 319—320). His research on the influence of gases on Bacteria won for him the Frankland Prize, as well as the Associateship of the Institute of Chemistry. In 1881 Mr. Hatton was appointed scientific explorer to the British North Borneo Company. He had successfully borne the hardships of travel in North Borneo, exploring the greater part of the Company's territory. For his work in Borneo he had qualified himself by unremitting labour. He spoke and wrote the languages of the country—Malay and Dusun; and at the time of his death he was engaged in preparing a Dictionary of the latter language. The reports he had already sent home covered a wide range of scientific exploration—geographical, geological, and otherwise; extracts from which have already been published by the Company for private circulation. In his last letter he announced that he was going on an expedition down the Seguama river to Mount Salam, whence he was to return to Elopuran, and thence to England. The fact that he died near Elopuran indicates that he had successfully accomplished this, his latest official mission. It is understood that he was keeping a diary for publication on his return home. Mr. Hatton's body is to be brought to England for interment; and his diaries will be collected and published. I will conclude this notice with a quotation from a letter which I have received from Dr. Frankland, dated March 28:—"Mr. Frank Hatton was a young chemist of very great promise, who would certainly, had he lived, have communicated to the scientific world important observations resulting from his explorations in Borneo. The untimely death of such an accurate, acute, and trained observer is a serious loss to science."

Friederich Wöhler was born on the 31st of July, 1800, at Eschersheim, near Frankfort, and he died at Göttingen, on September 23, 1882.

Neither space nor time will permit anything like an exhaustive review of the lifework of Wöhler to be given on this occasion. Only a short account of the principal facts of it can be given. This is extracted from a Work by Professor Hofmann ("Zur Erinnerung an Wöhler"), the advance proof-sheets of which he has kindly forwarded for the purpose to our Foreign Secretary, Dr. Hugo Müller, to whom I am indebted for the following abstract in English:—

In Wöhler, we have lost one of the veterans of our science. Born almost at the commencement of modern chemistry, he was himself one of the principal founders of organic chemistry; and by his unceasing and brilliant contributions during a long and active life he helped largely to raise the edifice of chemistry generally.

Wöhler's father, who was a man of very general accomplishments, had held for some time the post of Equerry to Prince Wilhelm II of Hesse, and afterwards a similar post in the service of the Duke of Meiningen, where, more especially by his various improvements in the agriculture of the little Principality, he attained a very influential position. Later, he became the proprietor of an estate at Roedelsheim, near Frankfort, and six years afterwards he was induced by the Prince-Primus Dahlberg to accept the post of Equerry at the Grand Ducal Court, and to reside at Frankfort. In this new position Wöhler's father became one of the most honoured citizens of Frankfort, and his memory still lives in connection with a variety of educational institutions and societies.

It was thus under the most favourable conditions that Wöhler began his educational career, entering, in 1814, the High School (Gymnasium) at Frankfort. In his predilection for the study of nature he received every encouragement from his father and others; and even at that time he took great delight in collecting minerals and in performing chemical experiments. Amongst the latter, we may mention the preparation of potassium by Curandau's process, which sufficiently indicates the degree of skill in chemical operations that he must have already attained.

The first paper by Wöhler, "On the occurrence of Selenium in the Iron Pyrites of Kraslitz, in Bohemia," was published at this time.

The time had now arrived for him to make up his mind as to what profession he should choose, and he decided for Medicine. He went, in 1820, to the University of Marburg, where he attended lectures on physics, mathematics, and anatomy. But as this University did not, at that time, afford a favourable opportunity for practical work in chemistry, he improvised a laboratory in his private rooms, and there pursued an investigation on certain cyanogen compounds.

He stayed, however, only one year at Marburg, and then exchanged this University for that of Heidelberg, to which place he was especially attracted by the enthusiasm he felt for Leopold Gmelin, who now became his teacher, and soon his friend and counsellor. Whilst at Heidelberg, he gave himself up to the study of medicine, but at the same time he carried on his researches on cyanic acid, the results of which he published in two papers, in 1822 and 1823. In this work we recognise the prelude to the famous investigation which later led to the artificial production of urea.

It was at this time that Gmelin and Tiedemann were engaged upon their chemico-physiological investigations. Tiedemann took a great personal interest in Wöhler, and to this is probably due the interest Wöhler took hereafter in the study of physiology. At this time he gained the prize for an essay on "Excretion in the Urine of Substances Foreign to the Animal Organism, but which are introduced into the Body." He proved the transformation of the salts of some of the fruit-acids into carbonates; whilst oxalic acid, succinic acid, and gallic acid, reappear in the form of alkaline salts.

Wöhler had as yet no idea of giving up the profession of medicine, to which he was ardently devoted; and it was only in the autumn of 1823, when he had already passed his examinations with distinction, that Gmelin persuaded him to give to his career a different direction, and to devote himself for the future entirely to chemistry. As he felt assured of his father's acquiescence, he was not long in deciding.

Soon afterwards, Wöhler was fortunate enough to receive permission from Berzelius to go to Stockholm, and work in his laboratory. Wöhler in his "Jugend-erinnerungen eines Chemikers," *Berlin Berichte*, 1875, has given a charming account of his sojourn in Sweden, and of the lasting friendship with Berzelius to which it led. Whilst in Berzelius's laboratory he occupied himself principally with mineral chemistry and quantitative analysis, in order to make himself thoroughly acquainted with the methods and manipulation of the great master. Later, he continued his researches on cyanic acid.

Towards the end of 1824 he returned from Sweden; and on paying a visit to his friends at Heidelberg, it was decided that he should attach himself to the University there, as "privat-docent" in chemistry. In order to prepare himself for the necessary formalities to be gone through for this purpose, he returned for a while to his father's house at Frankfort. But before his plans with regard to Heidelberg were realised, he was induced to change them in favour of taking the teachership of chemistry at the newly-founded municipal Trade School (Gewerbeschule) at Berlin, and on March 25th he commenced his new career there.

Having now, for the first time, a laboratory of his own, he began to work with more than his usual energy, though his time was well taken up by his official duties, and with the translation of Berzelius's work.

One of the earliest results of his new activity at Berlin was the preparation of the metal aluminium, soon followed by that of beryllium and yttrium. A great number of papers, chiefly on metallic compounds and minerals, date from this time. But all these investigations were put into the shade, when, in 1828, as an outcome of his long-continued research on cyanogen compounds, he dis-

covered the artificial production of urea. As the first example of the synthesis of a body hitherto only known as a product of animal life, this discovery will for ever hold its place as one of the most prominent landmarks in the development of organic chemistry.

In speaking of the lifework of Wöhler, it is impossible to omit reference to the many investigations of the highest importance which he carried out conjointly with Liebig.

It was shortly after Wöhler had returned from Sweden that he and Liebig met for the first time at Frankfort. They at once conceived a great interest for each other, which, in the course of time, developed into the most intimate and enduring friendship. Liebig was already Professor at Giessen, and Wöhler, going shortly afterwards to Berlin, their intercourse was mainly kept up by correspondence; although, in later life, they met in vacation times, and sometimes travelled together.

From the letters which form the earlier part of this correspondence, we obtain an interesting history of the important investigations which were conceived and carried out by them conjointly: such as on cyanic acid, 1830; on oil of bitter almonds, 1832; on the formation of the oil of bitter almonds, 1837; on uric acid, 1838; and others. On reading the accounts of these investigations by the light of these letters, we cannot help being struck by the happy coincidence which united two such powers for the pursuance of one common object.

Towards the end of 1831 Wöhler gave up his position at Berlin, and shortly afterward accepted a similar one at the newly established "Gewerbeschule" at Cassel. This he held until 1836, when he was appointed successor to Stromeyer in the Professorship of Chemistry at Göttingen.

It was whilst at Cassel that the famous work on "Oil of Bitter Almonds, or Compounds of Benzoyl," was carried out, conjointly with Liebig; an investigation which must undoubtedly be considered one of the most beautiful and fruitful of their associated labours. Even at the present day, we are struck by the completeness of experimental evidence, and the concise reasoning displayed, in this investigation. How vast and far-reaching has been the influence of this inquiry in giving direction to our conceptions of the general nature of chemical compounds. The admiration which this work calls forth even now, after the lapse of many years, was, however, equally felt, and expressed with enthusiasm, by contemporaries. Berzelius gave it as his opinion, that the facts put forward by this research give rise to such considerations, that they may well be deemed the beginning of a new era in vegetable chemistry.

Some years afterwards (in 1837), Liebig and Wöhler returned once more to the same subject, but this time with the view of inquiring into

the origin of this essential oil, which at that time was still shrouded in mystery. It is well known in how masterly a manner this problem was solved, and how the formation of this body was traced to the remarkable metamorphosis which amygdalin undergoes when submitted to the ferment-like action of emulsin. This action of the decomposition of amygdalin subsequently became a typical one.

Limited as our space here is, we must not omit to allude, if only a few words, to another of those joint works of Liebig and Wöhler, viz., the investigation on "Uric Acid and its Derivatives." The little that was known about uric acid at the time when the subject was taken up by the two investigators was far from definite, and these researches present a picture of the most indefatigable struggle to obtain an insight into the apparently unlimited mutability which characterises this substance. But this liability to chemical change, produced, on the other hand, such a harvest of results as has seldom fallen to the lot of chemical investigators. The numerous and remarkable substances which were brought to light by this research afford striking evidence of the skill in manipulation, and of the scrupulous accuracy, with which the experiments were conducted.

We must content ourselves here with this scanty notice of some of the joint work with which Liebig and Wöhler have endowed our science, and return to Wöhler's own labours.

It would lead too far, were we to attempt to give an account even of the more prominent of the vast number of papers published by Wöhler during his long and active life. In the Royal Society Catalogue of Scientific Papers there are about 270 papers and notices recorded under his name, ranging over all branches of chemistry, thus manifesting his marvellous versatility; and there are besides between 40 and 50 papers of which he was joint author.

But admirable and meritorious as this useful activity may have been, there is still another aspect in which we have to view the services rendered by Wöhler to science. It is his function as a teacher to which we allude. From the time when he entered on his professorship in 1836, up to within a few years before his death, he attracted to Göttingen a never ceasing stream of pupils, who came from all parts of the world to pursue the study of chemistry under his guidance.

His kindly disposition, and the geniality of his manners, endeared him to his students. His never failing originality in devising new methods, and his skill in manipulation, were eminently calculated to inspire the youthful mind with ardour for work, and to kindle enthusiasm for the pursuance of science. Many of the active chemists of the present generation, both in Europe and America, have enjoyed the advantages of Wöhler's instruction, and owe their success in their

career to the impulse given to their studies whilst in the laboratory at Göttingen.

Dr. SCHUNCK said that all must regret that Dr. Gilbert was not in a position to accept the office to which he had been nominated by the Council. The Fellows were much indebted to him for his constant attendance and courtesy. He had much pleasure in proposing a hearty vote of thanks to Dr. Gilbert, and that his Report be adopted.

This was seconded by Prof. RONALDS, and carried unanimously.

Dr. GILBERT said he appreciated very highly the honour of having been President of the Chemical Society, and most sincerely regretted that, in consequence of the pressure of his own avocations, and the distance he lived from London, he had been obliged to relinquish the position at the end of the first year. His successor, Dr. Perkin, was a tried officer of the Society, and had by his communications contributed largely to the interest both of the Meetings, and of the Journal; and it seemed only fitting that a chemist who had devoted himself specially to organic chemistry should fill the office of President, when so many contributions relating to that branch of the science were brought before the meetings of the Society.

The TREASURER then presented his Report. The total income of the Society was about £3073, the expenditure about £2770, leaving a surplus of £303. The surplus was rather smaller than last year for several reasons. There had been an increase in the expense connected with the Journal of £217; with the library of £61; the income was also rather less than was anticipated, owing to the fact that a smaller proportion than usual of the new Fellows had compounded. Next year there would probably be no surplus, as it would be taken up by the expenses connected with the new catalogue, and the re-decoration of the Society's rooms. The assets of the Society consisted of £7788 stock, and a balance at the bank of £1194. As to the Research Fund, £220 had been given in grants during the year. The assets consist of £4500 stock, and a balance at the bank of £166. The donations to the fund had fallen off considerably.

Mr. WARINGTON proposed a vote of thanks to the Treasurer, which was seconded by Mr. MAKINS, and carried unanimously.

Votes of thanks were given to the Auditors, the Council and Officers, and the Editor, Sub-editor, and Abstractors.

Messrs. W. Thorp and J. A. R. Newlands were then nominated Scrutators, and the following Officers and Council were declared duly elected:—

President.—W. H. Perkin, Ph.D., F.R.S.

Vice-Presidents.—F. A. Abel, Warren de La Rue, E. Frankland, J. H. Gilbert, J. H. Gladstone, A. W. Hofmann, W. Odling, Lyon

Playfair, H. E. Roscoe, A. W. Williamson, A. Crum-Brown, P. Griess, G. D. Liveing, J. E. Reynolds, E. Schunck, A. Voelcker.

Secretaries.—H. E. Armstrong, J. Millar Thomson.

Foreign Secretary.—Hugo Müller.

Treasurer.—W. J. Russell.

Council.—E. Atkinson, Capt. Abney, H. T. Brown, W. R. E. Hodgkinson, D. Howard, F. R. Japp, H. McLeod, G. H. Makins, R. Meldola, E. J. Mills, C. O'Sullivan, C. Schorlemmer.

RESEARCH FUND.

During the past year grants from the Research Fund have been made as follows, on the recommendation of the Research Fund Committee:—

£100 to Dr. Wright for the continuation of his research on the Determination of Chemical Affinity in Terms of Electromotive Force.

£25 to Messrs. Cross and Bevan for the investigation of Certain Varieties of Cellulose.

£25 to Dr. Rennie for the further investigation of Australian Sarsaparilla.

£25 to Mr. Shenstone for the further investigation of the Nux Vomica Alkaloïds.

£15 to Mr. Watson Smith for the investigation of a Sublimate formed in the Manufacture of Aurin.

£25 to Professor Tilden for the investigation of the C_5H_8 Hydrocarbons and the Decomposition of Terpenes by Heat.

£10 to Mr. James for the investigation of Ethylene Chlorobromide and its Homologues.

	£	s.	d.	£	s.	d.
Balance at Bank March 24th, 1882	1,420	8	10			
,, in hands of Treasurer	1	16	7			
				1,422	5	5
Receipts by Admission Fees, Subscriptions, and Life Compositions, from March 24th, 1882, to March 21st, 1883.						
10 Life Compositions	200	0	0			
114 Admission Fees	456	0	0			
11 Subscriptions for 1880	22	0	0			
53 ,, ,, 1881	106	0	0			
240 ,, ,, 1882	464	0	0			
615 ,, ,, 1883	1,194	3	6			
1 ,, ,, 1884	2	0	0			
				2,444	3	6
Sale of Journal and Index				328	16	6
Subscriptions for Proceedings of Royal Society				37	10	0
,, from Institute of Chemistry	8	10	0			
,, ,, Public Analysts	4	0	0			
,, ,, Society of Chemical Industry	4	15	0			
				17	5	0
Dividends on Consols	116	15	0			
,, Metropolitan Board of Works Stock	98	0	10			
,, London and North Western Railway Debenture Stock	30	14	3			
				245	10	1
				4,495	10	6

Assets.	£	s.	d.
Balance at Bank	1,194	10	9
,, in Treasurer's hands	1	11	8
Three per Cent. Consols	4,000	0	0
London and North Western Railway Debenture Stock	788	0	0
Metropolitan Board of Works 3½ per cent. Stock	3,000	0	0

	£	s.	d.	£	s	d.
Expenses on Account of Journal.						
Salary of the Editor	250	0	0			
,, Sub-Editor	100	0	0			
Fees to Abstractors	312	2	11			
Incidental expenses of Editor	3	0	0			
Periodicals for use of Abstractors	39	9	0			
Distribution of Journal	187	0	6			
Printing of Journal	1,011	0	10			
Photographic Printing of Spectra	42	0	0			
				1,944	13	3
Expenses on Account of Library.						
Salary of Librarian	50	0	0			
,, Library Attendant	62	0	0			
Books and Periodicals	149	10	8			
Binding Books	45	19	2			
				307	9	10
Printing Authors' Copies				25	7	0
Proceedings of Royal Society, and Distributing same				36	0	0
Reports of Meetings				24	0	0
Miscellaneous Printing				31	7	0
Insurance of Furniture and Books				2	0	0
Inhabited House Duty and Income-tax				8	13	1
Stationery, Postage, &c.				37	7	6
Collector's Commission on Subscriptions				122	3	0
Treasurer's Stamps and Clerical Aid and Drafts				5	2	3
Expenses connected with Prof. Dewar's Lecture				4	10	0
Photographs of Presidents				6	6	0
House Expenses.						
Providing Refreshments at Meetings	21	9	10			
Heating the Building	20	2	0			
Lighting ,,	52	19	10			
Cleaning ,,	20	0	0			
Wages of House Porter	52	0	0			
Petty House Expenses	11	9	6			
Repairs and Alterations	20	18	10			
Three Ballot Boxes	12	12	0			
Gratuity to Gate Porters	2	2	0			
				213	14	0
Treasurer's Petty Cash Disbursements				0	15	2
April 26th. Purchase of £500 Metropolitan Board of Works 3½ per cent. Stock				530	0	0
Balance in Bank	1,194	10	9			
,, in hands of Treasurer	1	11	8			
				1,196	2	5
				4,495	10	6

Examined and found correct. { LEONARD TEMPLE THORNE, W. R. EATON HODGKINSON, DAVID HOWARD.

The Treasurer of the Chemical Society in Account with the Research Fund.
From March 24th, 1882, to March 21st, 1883.

Dr.

	£	s.	d.
Balance at Bank, March 24th, 1882	341	2	10
Subscriptions and donations	120	1	0
Dividend on North British Railway Stock	19	10	2
,, Metropolitan 3½ per cent. Stock	117	13	3
	£598	7	3

Cr.

	£	s.	d.
July, 1882. Grants made	125	0	0
Jan., 1883. Grants made	95	0	0
Purchase of £200 Metropolitan 3½ per cent. Stock	212	0	0
Balance	166	7	3
	£598	7	3

Assets.	£	s.	d.
North British Railway 4 per cent. Stock.	1,000	0	0
Metropolitan Board of Works 3½ per cent. Stock	3,500	0	0
Balance at Bank	166	7	3

Examined and found correct,

Leonard Temple Thorne,
W. R. Eaton Hodgkinson,
David Howard.

HARRISON AND SONS, PRINTERS IN ORDINARY TO HER MAJESTY ST MARTIN'S LANE.